|  |  |  |  |
| --- | --- | --- | --- |
| Instructor | ***Luke Papademas*** | Due Date | **7/28** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Part | **1** | **2** | **3** | **4** | Total |
| *Maximum Points* | **25** points | **25** points | **25** points | **25** points | **100**G101010 pointsG |
| ***Your Score*** |  |  |  |  |  |

**Textbook Reading Assignment**

Thoroughly read Chapter(s) 12 in your Computer Architecture and Organization textbook.

**Part 1 Glossary Terms - Network Organization and Architecture**

Define, in detail, each of these glossary terms from the realm of computer architecture and computer topics, in general. If applicable, use examples to support your definitions. Consult your notes

or course textbook(s) as references or the Internet by visiting Web sites such as:

[**http://www.ask.com**](http://www.ask.com) or [**http://www.webopedia.com**](http://www.webopedia.com/)

**(a) IoT**

|  |
| --- |
| IoT stands for Internet of Things. It is a name for the Internet attachment of devices other than traditional host of client computers to the Internet. It encompasses things such as intelligent control devices capable of self-management; |

**(b) IPv4**

|  |
| --- |
| IPv4 is one of the core protocols of the Internet. It is a connectionless protocol for used on packet switched networks. |

**(c) log 10 ( x )**

|  |
| --- |
| In networking, logarithms are used to calculate the Signal to Noise Ratio. |

**(d) OSI**

|  |
| --- |
| The OSI model is a model that details the hierarchy and functions of network protocols, beginning at the physical layer at Level 1, through the application layer at Level 7. |

**(e) WEP**

|  |
| --- |
| WEP stands for Wired Equivalent Privacy. It is an encryption protocol for use in wireless networks. It was deprecated in 2004. |

**Part 2 Exercises - Network Organization and Architecture**

For each of the following, enter True or False.

\_T\_\_\_\_ **(1)** TCP is a connection - oriented protocol.

\_F\_\_\_\_ **(2)** One of the problems that IPv6 is intended to solve is the lack of class A address space.

\_T\_\_\_\_ **(3)** The aggregatable global unicast address format of IPv6 helps keep the size of router tables under control.

\_T\_\_\_\_ **(4)** It is possible for a single host to support both IPv4 and IPv6 .

\_T\_\_\_\_ **(5)** Security experts caution that wired equivalent privacy ( WEP ) is insufficient to block all types of network intrusion.

\_T\_\_\_\_ **(6)** It is possible for a computer with a single logical address to have more than one NIC each with distinct MAC addresses.

\_F\_\_\_\_ **(7)** Switches handle only one packet at a time while hubs can handle multiple incoming and outgoing packets simultaneously.

\_F\_\_\_\_ **(8)** Distance vector routing considers latency in the network before assigning a route to a packet.

\_T\_\_\_\_ **(9)** The Internet of Things ( IoT ) is used to describe intercommunicating control and sensory nodes.

\_T\_\_\_\_ **(10)** Because SCADA systems pre - date the Internet they not considered part of the IoT .

**Part 3 Exercises - Network Organization and Architecture**

**(1)** **( Protocols )**

How is a Network Layer protocol different from a Transport Layer protocol?

|  |
| --- |
| **Network layer protocols are concerned with addressing and routing while Transport layer protocols are concerned with error correction and handshaking.** |

**(2)** **( History of Networks )**

List five important events in the history of computer networking.

|  |
| --- |
| * **1960s – ARPA develops an early packet switching technology** * **1968 – Defense Department funded the DARPAnet to connect computers** * **1972 – commercial services using X.25 were deployed** * **1976 – ARCNET created** * **1985 – NSF created NSFnet** |

**(3)** **( Network Traffic )**

In what way is the traffic of an early business computer network different from that of an early scientific - academic network? Is there such a distinction between these two types of systems today?

|  |
| --- |
| **Traffic on an early business computer network was designed to enable high-speed transaction entry and customer service inquiries. Traffic on an early scientific-academic network was designed to share information for research. There is not really a distinction today as most traffic is routed through the internet using shared networks.** |

**(4)** **( ISO / OSI Protocol Stack )**

Why is the ISO / OSI protocol stack called a reference model? Do you think this will always be the case?

|  |
| --- |
| **The ISO / OSI protocol stack is called a reference model because virtually no commercial system uses all of the features precisely as specified in the model. I think it will always be this way because as technology improves the model may no longer be applicable to how networks are designed.** |

**(5)** **( Class A , B and C Networks )**

Into which class of networks do the following IP addresses fall?

(a) 180.265.14.3 (b) 218.193.149.222 (c) 92.146.292.7

|  |
| --- |
| 1. **Class B** 2. **Class C** 3. **Class A** |

**Part 4 Exercises - Network Organization and Architecture**

Write a complete answer for each of these.

**(1) ( Class A , B and C Networks )**

Into which class of networks do the following IP addresses fall?

(a) 191.57.229.163 (b) 223.52.176.62 (c) 127.255.255.2

|  |
| --- |
| 1. **Class B** 2. **Class C** 3. **Class A** |

**(2) ( TCP / IP )**

What problems would present themselves if TCP did not allow senders and receivers to negotiate a timeout window?

|  |
| --- |
| **If TCP did not allow for a timeout window, there may be a resource lock while a sender or receiver awaits a response causing an endless situation where a sender or receiver is awaiting a response.** |

**(3) ( Signal - to - Noise Rating )**

The signal power for a particular class of network wiring is 8733.26 dB and the noise rating at that particular signal strength at 100MHz is 41.8 dB . Find the signal - to - noise ratio for this conductor.

Hint: apply this formula

Signal - to - Noise Ratio ( dB ) = 10 log 10 ( signal strength dB / noise rating dB )

|  |
| --- |
| **23.2 dB** |

**(4) ( Signal - to - Noise Rating )**

The signal - to - noise rating for the network wiring in Part a is 9.5 dB and the noise rating is 36.9 dB when a 200MHz signal is transmitted. What is the signal strength?

Hint: apply this formula

Signal - to - Noise Ratio ( dB ) = 10 log 10 ( signal strength dB / noise rating dB )

|  |
| --- |
| **328.87 dB** |

**(5) ( Signal - to - Noise Rating )**

The signal power for a particular class of network wiring is 2898 dB and the noise rating at that particular signal strength at 100MHz is 40 dB . Find the signal - to - noise ratio for this conductor.

|  |
| --- |
| **18.6 dB** |